

Roentgenologic Examination of the Small Bowel—*An Improved Technique*

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■ *In examination of the small intestine, shortened transit time and improved quality were achieved by using the following items of regimen: 1, No laxative; 2, nothing by mouth for 8 hours before examination; 3, 600 ml of micropulverized barium sulfate; 4, patient to lie in right decubitus position for at least one hour between films; and 5, ingestion of 200 ml of cool tap water a half hour after the start of the examination.*

ROENTGENOLOGIC EXAMINATION of the small intestine may be a long procedure. Although many methods for accelerating it have been set forth, including the parenteral administration of neostigmine,³ the oral administration of ice-cold saline solution and the use of purgatives,² we believe that such practices may introduce small bowel distention and disturbances of motility, which might confuse rather than clarify the diagnosis. Hence we have investigated another means of shortening the procedure without sacrificing quality of examination.

Material and Method

A variation of the optimal technique described by Nice⁴ was used and was compared with our previous technique. Since a method was to be tested, patients with organic disease of the small bowel were excluded from this study. Two groups of patients were evaluated. *Group 1* (102 subjects) included all patients who underwent small

bowel study in our department of radiology between June 1, 1962 and June 30, 1963. Patients in this group did not have colon preparation, took nothing by mouth after midnight preceding the examination, and received 300 to 500 ml barium sulfate USP at 8:00 a.m., the time of fluoroscopic study. Between the ingestion of barium and subsequent filming the patient sat in his dressing room or walked about. He took no food unless the examination required longer than four hours, in which case he received a light breakfast. *Group 2* (100 subjects) included all patients who underwent small bowel examination between July 1, 1963 and July 31, 1964. These patients also had no colon preparation and took nothing by mouth after midnight before the examination. At 8:00 a.m., each received 600 ml of micropulverized barium sulfate suspension. Between films, the patient lay in the right decubitus position for a half hour, then drank 200 ml of cool water, and again lay in the right decubitus position for a half hour.

The relative merits of the two techniques were judged on the basis of the following criteria:

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1. *Transit time*—from ingestion of barium to the first roentgenographic appearance of barium in the colon.

2. *Uniformity of filling*—a subjective impression of the total number of loops of small intestine satisfactorily opacified.

3. *Flocculation*—the formation of coarse collections of barium.

4. *Segmentation*—the formation of localized clumps of barium, within loops, not in conformity with barium in adjacent loops.

5. *Caliber of small bowel loops*—judged by the criteria of Caldwell and Floch¹: That is, the diameter of the jejunum was considered abnormal if it exceeded 3.0 cm; that of the ileum was considered abnormal if it exceeded 2.5 cm.

6. *Mucous membrane pattern or clarity of bowel outline*—evaluated subjectively as optimal, coarse or fuzzy.

Results

The observations based on the above criteria are compared in Table 1.

The improvement in the average transit time,

TABLE 1.—Incidence of Undesirable Roentgenographic Qualities in Small Bowel Examinations

Undesirable Roentgenographic Quality	Incidence	
	Group 1 (102 Patients)	Group 2 (100 Patients)
Lack of uniformity in filling	4	2
Flocculation	31	15
Segmentation	37	11
Abnormal caliber	6	8
Poor mucous membrane pattern, or obscurity of bowel outline	14	5

from 176 minutes for *Group 1* to 90 minutes for *Group 2*, is statistically significant. According to all criteria, the quality of the examination was also improved in *Group 2*, except for the incidence of abnormal intestinal caliber, where the slight difference in favor of *Group 1* was not statistically significant.

Discussion

The different form of barium sulfate suspension used in *Group 2* accounts for the improvement in quality; but it is doubtful that the type of suspension *per se* would affect intestinal motility and, therefore, transit time. Shortening of transit time is thus traceable to differences introduced in other factors—positioning, quantity of barium used, and fluid intake. The technique described for *Group 2* is recommended to radiologists who want a safe, rapid, drugless method of examining the small intestine.

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